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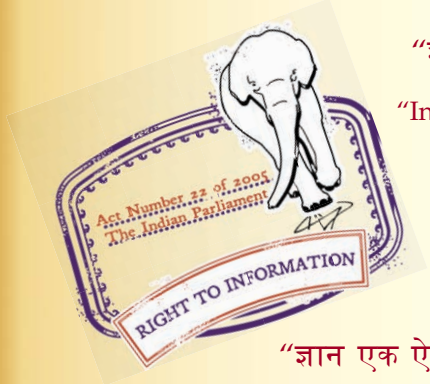

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FILLING PRESSURE AND CORRESPONDING DEVELOPED PRESSURE FOR PERMANENT GASES CONTAINED IN CYLINDERS

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Indian Standard

FILLING PRESSURE AND CORRESPONDING DEVELOPED PRESSURE FOR PERMANENT GASES CONTAINED IN CYLINDERS

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Indian Standard

FILLING PRESSURE AND CORRESPONDING DEVELOPED PRESSURE FOR PERMANENT GASES CONTAINED IN CYLINDERS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 28 March 1978, after the draft finalized by the Gas Cylinders Sectional Committee had been approved by the Mechanical Engineering Division Council.

0.2 Manufacture, possession and use of any gas when contained in cylinders in compressed or liquefied state is regulated under the Gas Cylinder Rules, 1940, of the Government of India as amended from time to time. This specification has been prepared in consultation and agreement with the statutory authorities under those rules.

0.3 This standard has been prepared for the guidance of the designers, users, manufacturers and fillers of gas cylinders for permanent gases to ensure their safe design, handling and use.

0.4 The Indian Standards Institution has already published the following specifications for gas cylinders for permanent gases:

IS : 7285-1974 Seamless manganese steel cylinders for permanent and high pressure liquefiable gases.

IS : 7311-1974 Seamless high carbon steel cylinders for permanent and high pressure liquefiable gases.

0.5 In the preparation of this standard considerable assistance has been derived from BS 5355 : 1976 Filling ratios and developed pressures for liquefiable and permanent gases issued by the British Standards Institution.

0.6 The quantities in this standard have been expressed in technical metric units. However, in view of the introduction of International System (SI) units in the country, the relevant SI units and the corresponding conversion factors are given below for guidance:

$$1 \text{ kgf/cm}^2 = 98{\cdot}066\ 5 \text{ kPa} \quad (\text{kilopascal})$$
$$= 0{\cdot}980\ 665 \text{ bar}$$
$$= 0{\cdot}098\ 066\ 5 \text{ MPa} \quad (\text{megapascal})$$

0.7 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard specifies the values of internal pressure developed at a temperature of 65°C by different permanent gases when contained in cylinders, corresponding to their filling pressure at 15°C.

2. TERMINOLOGY†

2.0 For the purpose of this standard the following definitions shall apply.

2.1 Permanent Gas — A gas having a critical temperature not exceeding 0°C; in other words a gas that cannot be liquefied under any pressure at a temperature above 0°C.

2.2 Filling Pressure, p_f — The maximum permissible gauge pressure, converted to 15°C, at which a gas cylinder for permanent gas can be filled.

2.3 Maximum Developed Pressure, p_d — The internal pressure developed by the gas at the maximum attainable temperature of 65°C.

3. FILLING PRESSURE AND DEVELOPED PRESSURE

3.1 The values of filling pressures at 15°C, p_f, and corresponding developed pressure at 65°C, p_d, are given in Table 1. The ratio $C = \frac{p_d}{p_f}$ and critical temperature, T_c is also given in this table.

NOTE — Values for intermittent pressures may be linearly interpolated.

*Rules for rounding off numerical values (*revised*).

†For other terms *see* IS : 7241-1974 ' Glossary of terms used in gas cylinder technology '.

TABLE 1 DEVELOPED PRESSURE AT 65°C IN kgf/cm² (GAUGE), p_d, AND RATIO C

(*Clause* 3.1)

Filling Pressure p_f (Gauge) at 15°C, kgf/cm²	Air		Argon $T_c = -122°C$		Carbon Monoxide $T_c = -140°C$		Helium $T_c = -267·9°C$		Hydrogen $T_c = -239·9°C$		Methane $T_c = -82·1°C$		Neon $T_c = -228·7°C$		Nitrogen $T_c = -147°C$		Oxygen $T_c = -118·4°C$	
	p_d	$C = \frac{p_d}{p_f}$	p_d	$C = \frac{p_d}{p_f}$	p_d	$C = \frac{p_d}{p_f}$	p_d	$C = \frac{p_d}{p_f}$	p_d	$C = \frac{p_d}{p_f}$	p_d	$C = \frac{p_d}{p_f}$	p_d	$C = \frac{p_d}{p_f}$	p_d	$C = \frac{p_d}{p_f}$	p_d	$C = \frac{p_d}{p_f}$
35·16	41·98	1·195	41·77	1·189	42·05	1·196	40·72	1·158	41·21	1·171	42·62	1·213	41·42	1·177	41·98	1·195	41·98	1·194
70·32	84·88	1·207	85·02	1·209	85·16	1·211	82·70	1·176	82·63	1·175	88·04	1·252	82·84	1·178	84·81	1·206	85·16	1·211
105·49	128·83	1·222	129·18	1·225	129·25	1·225	123·91	1·175	124·05	1·176	136·29	1·292	124·40	1·180	128·69	1·220	129·47	1·227
139·24	171·80	1·234	172·64	1·240	172·43	1·238	163·43	1·174	163·78	1·176	185·79	1·334	164·35	1·180	171·52	1·232	172·78	1·241
140·65	173·56	1·234	174·47	1·241	174·26	1·239	165·12	1·174	165·47	1·176	187·90	1·336	165·96	1·180	173·28	1·232	174·68	1·242
175·81	218·64	1·244	220·82	1·256	219·90	1·251	206·75	1·176	206·96	1·176	242·33	1·378	207·59	1·181	218·07	1·240	221·03	1·257
210·97	264·28	1·253	268·21	1·271	265·96	1·261	249·37	1·182	248·31	1·177	295·22	1·399	249·30	1·182	263·36	1·248	268 14	1·271
232·07	292·26	1·260	297·12	1·280	293·88	1·266	274·40	1·182	273·21	1·177	327·57	1·411	274·33	1·182	290·93	1·254	297·05	1·280
246·13	310·83	1·263	316·60	1·286	312·45	1·269	290·79	1·181	289·80	1·177	349·37	1·420	291·00	1·182	309·35	1·257	316·53	1·286
281·23	357·74	1·272	365·26	1·298	358·72	1·275	331·93	1·180	332·84	1·183	401·97	1·429	333·12	1·184	355·41	1·264	365·96	1·301

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